

Algebraic Concepts  
Lesson 16: Inductive Reasoning and Patterns  
Math for Standards

Name \_\_\_\_\_

Date \_\_\_\_\_

*EQ: How can you use reasoning to extend patterns?*

**Inductive reasoning** is when you use an \_\_\_\_\_ to  
make a generalization about the pattern.

An \_\_\_\_\_ is one where each term is found by  
\_\_\_\_\_ the same amount from term to term (**common difference**).

A \_\_\_\_\_ is when you \_\_\_\_\_  
by the same number from term to term (**common ratio**).

Formula for an **arithmetic sequence**:

Formula for finding the **sum of consecutive terms in an arithmetic sequence**:

Formula for a **geometric sequence**:

Example 1: Determine whether the sequence is arithmetic, geometric, or neither. If it is arithmetic, write the common difference. If it is geometric, write the common ratio. Then, if possible, find the next four terms of the sequence.

a. 2, -4, 6, -8, ...

b. 7, 14, 28, 56, 112, ...

c. 1.5, -0.5, -2.5, -4.5, ...

d. 1, 6, 36, 216, ...

Example 2: The first four terms of an arithmetic sequence are given. Find the required term and sum.

a. 8, 11, 14, 17, ... Find the 10<sup>th</sup> term and the sum of the first 10 terms.

b. 27, 31, 35, 39, ... Find the 12<sup>th</sup> term and the sum of the first 12 terms.

Example 3: Draw the next three shapes in the pattern.

